

## LISTING OF THE CLAIMS

1. (Cancelled).
2. (Cancelled).
3. (Currently amended) An apparatus for converting hydrocarbon fuel into a hydrogen rich gas comprising:
  - a heat exchanger for heating a hydrocarbon fuel into a heated hydrocarbon fuel;
  - ~~The apparatus according to claim 2, further comprising~~ a desulfurization reactor including a catalyst for reacting the heated hydrocarbon fuel under desulfurization conditions to produce a substantially desulfurized hydrocarbon fuel, wherein the hydrocarbon fuel becomes a hydrocarbon fuel feed to a the manifold;
  - a manifold for mixing the substantially desulfurized hydrocarbon fuel with an oxygen containing gas to give a fuel mixture;
  - an autothermal reactor including a catalyst for reacting the fuel mixture under autothermal reforming conditions to give a hydrogen containing gaseous mixture;
  - a water gas shift reactor including a catalyst for reacting the hydrogen containing gaseous mixture under water gas shift reaction conditions to give an intermediate hydrogen containing gaseous mixture with a substantially reduced carbon monoxide content; and
  - a selective oxidation reactor including a catalyst for reacting the intermediate hydrogen containing gaseous mixture under selective oxidation reaction conditions to produce the hydrogen rich gas;

wherein the heat exchanger and the desulfurization reactor are disposed in a first compartment and the autothermal reactor is disposed in a second compartment.

4. (Currently amended) The apparatus according to claim 3 4, further comprising a heat exchanger for heating the fuel mixture to produce a heated fuel mixture, wherein the heated fuel mixture becomes the fuel mixture feed to the autothermal reactor.
5. (Original) The apparatus according to claim 4, further comprising a desulfurization reactor including a catalyst for reacting the hydrogen containing gaseous mixture under desulfurization conditions to produce a substantially desulfurized hydrogen containing gaseous mixture, wherein the substantially desulfurized hydrogen containing gaseous mixture becomes the hydrogen containing gaseous mixture feed to the water gas shift reactor.
6. (Currently amended) The apparatus according to claim 3 4, wherein the hydrocarbon fuel is selected from the group consisting of natural gas, methane, ethane, propane, butane, liquefied petroleum gas, naphtha, gasoline, kerosene, diesel, methanol, ethanol, propanol, and combinations thereof.
7. (Currently amended) The apparatus according to claim 3 4, wherein the hydrogen rich gas contains less than 50 ppm of carbon monoxide.
8. (Currently amended) The apparatus according to claim 3 4, further comprising an anode tail gas oxidizer including a catalyst for reacting the

unconverted hydrogen from a fuel cell under oxidation conditions to create a hot anode tail gas oxidizer effluent.

9. (Original) The apparatus according to claim 8, wherein the hot anode tail gas oxidizer effluent is heat integrated with the apparatus.
10. (Currently amended) An apparatus for converting hydrocarbon fuel into a hydrogen rich gas comprising:
  - a first heat exchanger for heating the hydrocarbon fuel to produce a heated hydrocarbon fuel;
  - a first desulfurization reactor for reacting the heated hydrocarbon fuel to produce a substantially desulfurized hydrocarbon fuel; a manifold for mixing the substantially desulfurized hydrocarbon fuel with an oxygen containing gas to produce a fuel mixture;
  - a second heat exchanger for heating the fuel mixture to produce a heated fuel mixture;
  - an autothermal reactor including a catalyst for reacting the heated fuel mixture to produce a first hydrogen containing gaseous mixture;
  - a second desulfurization reactor for reacting the first hydrogen containing gaseous mixture to produce a second hydrogen containing gaseous mixture that is substantially desulfurized;
  - a water gas shift reactor for reacting the second hydrogen containing gaseous mixture to produce a third hydrogen containing gaseous mixture with a substantially decreased carbon monoxide content; and
  - a selective oxidation reactor for reacting the third hydrogen containing gaseous mixture to produce the hydrogen rich gas; and

wherein the first heat exchanger and the first desulfurization reactor are disposed in a first compartment and the autothermal reactor is disposed in a second compartment.

11. (Original) The apparatus according to claim 10, wherein the hydrocarbon fuel is selected from the group consisting of natural gas, methane, ethane, propane, butane, liquefied petroleum gas, naphtha, gasoline, kerosene, diesel, methanol, ethanol, propanol, and combinations thereof.
12. (Original) The apparatus according to claim 10, wherein the hydrogen rich gas contains less than 50 ppm of carbon monoxide.
13. (Original) The apparatus according to claim 10, further comprising an anode tail gas oxidizer including a catalyst for reacting the unconverted hydrogen from a fuel cell under oxidation conditions to create a hot anode tail gas oxidizer effluent.
14. (Original) The apparatus according to claim 13, wherein the hot anode tail gas oxidizer effluent is heat integrated with the apparatus.

Claims 15-28 (Cancelled).